

## ABSTRACT

A satellite modem whose baseband modules can be implemented mostly in software running on a suitable processor such as a high speed digital signal processor (DSP). The modem includes a RF portion and a baseband portion. The digitized output of a matched filter is input to the baseband processing portion that consists of software executing on a DSP. The modem comprises an antenna coupled to an upconverter/downconverter. The upconverter/downconverter is coupled to a RF transceiver which functions to receive a transmit signal from a baseband transmitter module and generate a signal for input to the upconverter/downconverter. The RF transceiver also functions to receive a downconverted signal and output an IF signal for input to an IF module. The IF functions to generate I and Q outputs that are input to a digital baseband module. The baseband module can be implemented as software executing on a DSP. Also included in a technique of modulation wipe off wherein the effects of modulation are removed. A signal detection technique performs signal detection and frequency acquisition in the presence of multiple signals in accordance with a method described hereinbelow. A timing acquisition technique includes an unwrapping technique that functions to correct timing errors before averaging is performed. Linear changes to the time estimates are performed using LSR techniques.